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MOTOROLA, INC.
CORPORATE LAW DEPARTMENT - #56-238
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EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 03/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/649,528

Applicant(s)

KORIPPELLA ET AL.

Examiner

Jennifer A. Leung

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-11,13-18,20 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-11,13-18,20 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's After Final Amendment submitted on February 5, 2004 has been received and carefully considered. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn. Claims 2, 12 and 19 are cancelled. Claims 1, 3-11, 13-18, 20 and 21 remain active.

Claim Objections

2. Claims 8, 9, 13 and 14 are objected to because the claims improperly depend from cancelled claims 2 and 12. Appropriate correction is required.

Response to Arguments

3. Applicant's arguments filed on February 5, 2004 with respect to the rejection of claims 1, 3-11, 13-18, 20 and 21 under 35 U.S.C. 103(a) as being unpatentable over Hsu et al. in view of Ashmead et al. have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the newly found prior art reference(s).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3, 5-8, 11, 13-16, 18, 20 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Furuya et al. (JP 06-111838).

A. Independent claim 1 and corresponding dependent claims 3, 5-8 and 10

Regarding claims 1 and 10, Furuya et al. (see Figures, Abstract, and JPO Machine Translation) disclose an apparatus comprising:

a three-dimensional, multi-layer, integral, sintered, monolithic ceramic carrier structure (i.e., plates **1**, **2** comprising materials having high thermal conductivity, including sintered ceramic; FIG. 1, 2; sections [0017], [0030]-[0033]), the carrier structure further defining a fuel processor (i.e., a reforming machine **42**, comprising plates **1** and **2**; FIG. 8, 15; sections [0040]-[0043]; [0074]-[0077]) having a reaction zone including a reforming catalyst (i.e., reforming catalyst **6** of plate **1**; FIG. 1, 2; sections [0010]-[0014]) and inherently comprising a vaporization zone, as evidenced by the disclosed evaporation of “poured” methanol within the fuel processor (i.e., Example 1; sections [0060]);

at least one channel formed in the ceramic carrier structure **1**, **2** for transporting a liquid fuel to the vaporization zone and a vapor in the reaction zone (i.e., passages **3**; Example 1);

an inlet channel for introducing the liquid fuel into the fuel processor (i.e., as schematically shown in FIG. 8, an inlet channel via piping **43** for supplying liquid fuel from tank **41'** to fuel processor **42**; as schematically shown in FIG. 15, an inlet channel via piping **80/43** for supplying fuel from tank **41** to fuel processor **42**); and

an outlet channel for transporting hydrogen enriched gas out of the fuel processor (i.e., as schematically shown in FIG. 8, an outlet channel via piping (not labeled) for transporting reformed gases out of fuel processor **42**; as schematically shown in FIG. 15, an outlet channel via piping (not labeled) for transporting reformed gases out of fuel processor **42** to fuel cell **45**).

Regarding claims 3 and 7, Furuya et al. disclose an integrated heat source (i.e., comprising combustion plates **2**) thermally coupled to the reaction and vaporization zones (i.e., reforming plates **1**) using thermally conductive channels or thermally conductive vias (i.e., thermally conductive passages **4**; FIG. 1, 2; sections [0010]-[0016]).

Regarding claims 5 and 6, Furuya et al. discloses the integrated heat source comprises a chemical heater including a catalyst and arranged to oxidize fuel (i.e., plates **2** including a combustion catalyst **5** coated on passages **4**; sections [0010]-[0016]), wherein the chemical heater further includes an air inlet (i.e., as schematically shown in FIG. 8, an air inlet (labeled in Japanese) to the piping **44** leading from fuel supply tank **41** to fuel processor **42**; and as schematically shown in FIG. 15, an air inlet **81** to the piping **44** leading from fuel supply tank **41** to fuel processor **42**), and wherein the inlet channel **80/43** further comprises an opening to provide fuel to the chemical heater **2** (i.e., as best illustrated in FIG. 15, piping **80** comprises an opening to provide fuel to the combustion portion of reforming machine **42** via piping **44**).

Regarding claim 8, Furuya et al. disclose the vaporization and reaction zones comprise a plurality of parallel channels (i.e., passages **3** in plates **1**; FIG. 1, 2).

B. Independent claim 11 and corresponding dependent claims 13-16

Regarding claims 11, 15 and 16, Furuya et al. (see Figures, Abstract, and JPO Machine Translation) disclose an apparatus comprising:
a three-dimensional integral, sintered, monolithic multi-layer ceramic carrier structure (i.e., plates **1, 2** comprising materials having high thermal conductivity, including sintered ceramic; FIG. 1, 2; sections [0017], [0030]-[0033]), the carrier structure further defining a fuel processor (i.e., a reforming machine **42**, comprising plates **1** and **2**; FIG. 8, 15;

Art Unit: 1764

sections [0040]-[0043]; [0074]-[0077]) having a reaction zone including a reforming catalyst (i.e., reforming catalyst 6 of plate 1; FIG. 1, 2; sections [0010]-[0014]) and inherently comprising a vaporization zone, as evidenced by the disclosed evaporation of "poured" methanol within the fuel processor (i.e., Example 1; sections [0060]); the vaporization and the reaction zones comprising a plurality of parallel channels formed in the ceramic carrier for transporting a liquid fuel to the vaporization zone and a vapor in the reaction zone (i.e., passages 3 in plates 1; FIG. 1, 2; Example 1); the ceramic carrier further comprising an integrated heater (i.e., combustion plates 2) thermally coupled to the reaction and vaporization zones using thermally conductive channels or thermally conductive vias (i.e., thermally conductive passages 4; FIG. 1, 2; sections [0010]-[0016]); an inlet channel for introducing the liquid fuel into the fuel processor (i.e., as schematically shown in FIG. 8, an inlet channel via piping 43 for supplying liquid fuel from tank 41' to fuel processor 42; as schematically shown in FIG. 15, an inlet channel via piping 80/43 for supplying fuel from tank 41 to fuel processor 42); and an outlet channel for transporting hydrogen enriched gas out of the fuel processor (i.e., as schematically shown in FIG. 8, an outlet channel via piping (not labeled) for transporting reformed gases out of fuel processor 42; as schematically shown in FIG. 15, an outlet channel via piping (not labeled) for transporting reformed gases out of fuel processor 42 to fuel cell 45).

Regarding claims 13 and 14, Furuya et al. discloses the integrated heater comprises a chemical heater including a catalyst and arranged to oxidize fuel (i.e., plates 2 including a

combustion catalyst **5** coated on passages **4**; sections [0010]-[0016]), wherein the chemical heater further includes an air port (i.e., as schematically shown in FIG. 8, an air inlet (labeled in Japanese) to the piping **44** leading from combustion fuel supply tank **41** to fuel processor **42**; as schematically shown in FIG. 15, an air inlet **81** to the piping **44** leading from supply tank **41** to fuel processor **42**), and wherein the inlet channel **80/43** further comprises an opening to provide fuel to the chemical heater **2** (i.e., as best illustrated in FIG. 15, piping **80** comprises an opening to provide fuel to the combustion portion of reforming machine **42** via piping **44**).

C. Independent claim 18 and corresponding dependent claims 20 and 21

Regarding claim 18, Furuya et al. (see Figures, Abstract, and JPO Machine Translation) disclose an apparatus comprising:
a three-dimensional integral, sintered, monolithic multi-layer ceramic carrier structure (i.e., plates **1**, **2** comprising materials having high thermal conductivity, including sintered ceramic; FIG. 1, 2; sections [0017], [0030]-[0033]), the carrier structure further defining a fuel processor (i.e., a reforming machine **42**, comprising plates **1** and **2**; FIG. 8, 15; sections [0040]-[0043]; [0074]-[0077]) having a reaction zone including a reforming catalyst (i.e., reforming catalyst **6** of plate **1**; FIG. 1, 2; sections [0010]-[0014]) and inherently comprising a vaporization zone, as evidenced by the disclosed evaporation of “poured” methanol within the fuel processor (i.e., Example 1; sections [0060]);
the vaporization and the reaction zones comprising a plurality of parallel channels formed in the ceramic carrier for transporting a liquid fuel to the vaporization zone and a vapor in the reaction zone (i.e., passages **3** in plates **1**; FIG. 1, 2; Example 1);
the ceramic carrier further comprising an integrated heater (i.e., combustion plates **2**; FIG. 1, 2)

thermally coupled to the reaction and vaporization zones (i.e., reforming plates 1; FIG. 1, 2) using thermally conductive structures (i.e., the walls defining combustion passages 4); an inlet channel for introducing the liquid fuel into the fuel processor (i.e., as schematically shown in FIG. 8, an inlet channel via piping 43 for supplying fuel from tank 41' to fuel processor 42; as schematically shown in FIG. 15, an inlet channel via piping 80/43 for supplying fuel from tank 41 to fuel processor 42); and an outlet channel for transporting hydrogen enriched gas out of the fuel processor (i.e., as schematically shown in FIG. 8, an outlet channel via piping (not labeled) for transporting reformed gases out of fuel processor 42; as schematically shown in FIG. 15, an outlet channel via piping (not labeled) for transporting reformed gases out of fuel processor 42 to fuel cell 45).

Regarding claims 20 and 21, Furuya et al. discloses the integrated heater comprises a chemical heater including a catalyst and arranged to oxidize fuel (i.e., plates 2 including a combustion catalyst 5 coated on passages 4; sections [0010]-[0016]), wherein the chemical heater further includes an air port (i.e., as schematically shown in FIG. 8, an air inlet (labeled in Japanese) to the piping 44 leading from combustion fuel supply tank 41 to fuel processor 42; as schematically shown in FIG. 15, an air inlet 81 to the piping 44 leading from supply tank 41 to fuel processor 42), and wherein the inlet channel 80/43 further comprises an opening to provide fuel to the chemical heater 2 (i.e., as best illustrated in FIG. 15, piping 80 comprises an opening to provide fuel to the combustion portion of reforming machine 42 via piping 44).

Instant claims 1, 3, 5-8, 11, 13-16, 18, 20 and 21 structurally read on the apparatus of Furuya et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 4, 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al. (JP 06-111838) in view of Ghosh et al. (US 5,961,932).

Regarding claim 4, Furuya et al. further discloses the fuel processor (i.e., reforming machine **42** comprising reforming and combustion plates **1, 2**, respectively) being integrally laminated with a fuel cell stack, wherein electricity generated by the stack may be used as, “a power source at the time of starting in a case of supplying hydrogen to a fuel-cell-fuel pole through a hydrogen ion conductive film from passage of a reforming machine,” section [0056]. In such a configuration, the electricity from the fuel cell stack heats the fuel processor because the, “reforming machine has electric conductivity,” section [0056]. Although Furuya et al. does not specifically state, “a resistive heater that is electrically driven,” the above configuration is substantially such. Furthermore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an electrically driven resistive heater for the integrated

heat source in the apparatus of Furuya et al., since the use of resistive heaters for supplying heat to a reaction is well known in the art, and the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). Ghosh et al. evidences the conventionality of using a resistive heating element for heating a reaction zone by teaching a reaction chamber 34 being heated by an embedded heating element 38 driven by electrical leads 40 (column 5, lines 19-28; FIG. 3).

Regarding claims 9 and 17, although Furuya et al. are silent as to the vaporization and reaction zones comprising at least one serpentine channel, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate shape for the plurality of parallel channels (passages 3; FIG. 1, 2) in the apparatus of Furuya et al., on the basis of suitability for the intended use, since changes in shape merely involves ordinary skill in the art. Furthermore, Ghosh et al. evidences the conventionality of providing channels of serpentine shape by teaching that, "It is instructive to note that a plurality of channels can be provided to handle more than two chemicals or alternatively the reaction chamber 34 can be made longer by configuring serpentine, complex, wavy, winding and angular meandering forms to allow for longer reaction time," (column 5, lines 15-19).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Minh et al. teaches a sintered, monolithic solid oxide ceramic fuel cell, similar to the three-dimensional integral, sintered, monolithic multi-layer ceramic carrier structure as taught by Furuya et al., above.

Art Unit: 1764

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung

March 2, 2004



HIEN TRAN
PRIMARY EXAMINER